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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/773,798	02/01/2001	Douglas Duane Coolbaugh	BUR920000143US1013890	8546

7590 10/15/2002
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EXAMINER

FARAHANI, DANA

ART UNIT PAPER NUMBER

2814

DATE MAILED: 10/15/2002

Please find below and or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/773.798

Applicant(s)

COOLBAUGH ET AL

Examiner

Dana Farahani

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133)
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 7/31/02.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s): _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s): _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Applicant's Admitter Prior Art (AAPA) in view of Tsuchiaki (U.S. 5,963,789), and further in view of Sedra and Smith (a book, Microelectronic circuits), all previously cited.

Regarding claims 1, 9, 14, and 15, AAPA discloses in figure 1 a method of providing a heterojunction bipolar transistor structure comprising at least an underlying SiGe base region 22, an insulator layer 26 formed on surface portions of the underlying SiGe base region, and an emitter 28 formed on the insulator layer and in contact with the underlying SiGe base region through an emitter opening formed in the insulator layer, the emitter, the insulator layer and the SiGe base region each having exposed sidewalls; and siliciding exposed silicon surfaces of at least the emitter and the SiGe base region.

AAPA does not disclose forming a passivation layer on the exposed sidewalls of the emitter, the insulator layer and portions of the SiGe base region.

Tsuchiaki discloses column 7, lines 1-9, that passivation layer 204 of figure 2C protects the sidewalls of the device shown. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form passivation

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layer on exposed sidewalls of the emitter, the insulator layer, and portion of the base region to protect those layers, and further isolate the emitter and the base contacts so there would be no shorts between base and emitter, so the transistor could be usable in a variety of applications (see Sedra and Smith, page 223, figure 4.2).

Regarding claims 2 and 5-8, AAPA in view of Tsuchiaki and further in view of Sedra and Smith renders obvious the claimed invention, as above discussed, except for expressly disclosing the passivation layer is formed by CVD. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use CVD at the condition the applicant discloses, since it was known in the art CVD under those conditions is used to deposit layers in a semiconductor device.

Regarding claims 3, 4, 16, and 17, AAPA in view of Tsuchiaki and Sedra and Smith renders obvious the claimed invention, as above discussed, except for the passivation layer being made of nitride, oxide, and oxynitride, or any combination thereof. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use these materials as passivation layer since it was known in the art that these layers are used as passivation layer.

Regarding claims 10-12, AAPA in view of Tsuchiaki and Sedra and Smith renders obvious the claimed invention, as above discussed, except for the insulation layer being made of SiO_2 or Si oxynitride, silicon used in the substrate, and an intrinsic emitter. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use these materials as passivation layer since it was known in

the art that these materials are commonly used as insulator and substrate, and use intrinsic emitter so there would be no need for adding impurities to the emitter.

Regarding claim 13, AAPA discloses patterned insulator 26 of figure 1. AAPA does not disclose multiple patterned insulator layers. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use multiple insulator layer since mere duplication of the essential working parts of a device involves only routine skill in the art.

Response to Arguments

3. Applicant's arguments filed 7/31/02 have been fully considered but they are not persuasive.

Applicant's argument that the combination of AAPA and Tsuchiaki does not render applicant's claimed structure obvious is not found persuasive, since the most noticeable feature of figure 1 (AAPA), for one with ordinary skill in the art, is that base and emitter, 22 and 28 respectively, are shorted together. Furthermore, AAPA discloses that the figure is a heterojunction bipolar transistor (see page1, line 23). But obviously, the transistor cannot function in most applications since the base and emitter are shorted together. As evidence, the newly cited reference, Sedra and Smith, is presented in above rejections. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to remove the silicide regions at only parts of the transistor (i.e. base and emitter portions that are connected) and instead, place passivation layer, as Tsuchiaki teaches, in order to protect the exposed parts.

4. Applicant argues that "as disclosed in Tsuchiaki, the passivation layer is formed *only* on vertical Si surfaces. There is no disclosure of forming the passivation layer on any other surfaces, let alone on exposed sidewalls of an emitter, a patterned insulator layer and a portion of a SiGe base region". Notice that Tsuchiaki reference is used because it discloses in column 7, line 8, that the passivation layer is used as a protection layer.

5. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art (*emphasis added*). See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, it would have been obvious to remove the silicide regions and replace it with a passivation region in the joint areas of the emitter and base for the reason discussed above.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

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mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (703)305-1914. The examiner can normally be reached on M-F 9:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703)306-2794. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Dana Farahani
October 8, 2002

